frequency range, with a transmission unit comprising an Inverse Discrete Fourier Transform unit (IDFT) by means of which a plurality of subchannels that subdivide the transmitting frequency range may be modulated with allocated subcarriers and with a receiving unit comprising a Discrete Fourier Transform unit (DFT), all the subcarriers contained in the fade-out range or adjacent to the fade-out range respectively may have a zero charge in the IDFT unit, more specifically for carrying out the method according to the invention.

It is the object of the present invention to indicate a transmission system of the type mentioned above that permits to increase the number of subcarriers available for modulation.

According to the invention this is achieved in that, for each frequency range extending between the subcarriers contained in the fade-out range and the subcarriers adjacent thereto respectively, a processing unit is provided for computing the side lobes occasioned by subchannels located outside the fade-out range, wherein the data to be transmitted can be entered at the input of the processing unit and the calculated amplitude and phase of the added side lobes may be sampled at the output of the processing unit, that a compensation filter is connected to the output of each processing unit, its transmitting function being identical with or similar to the spectrum of the side lobes of the corresponding frequency intermediate range and that the output of the compensation filter is connected to a first input of a subtraction member and the output of the IDFT unit to a second input of the subtraction member so that an interference-compensated transmitter signal may be sampled at the output of the subtraction member.

By providing a processing unit, the interference occasioned in the fade-out range may be calculated and compensated prior to sending each data block so that this range may be kept free from interferences.

The invention also relates to a transmission system for transmitting data by means of a multiple carrier method, e.g. DMT (Discrete Multitone) and for suppressing at least one narrow fade-out frequency range, with a transmission unit comprising an Inverse Discrete Fourier Transform unit (IDFT) by means of which a plurality of subchannels that subdivide the transmitting frequency range may be modulated with allocated subcarriers and with a receiving unit comprising a

Discrete Fourier Transform unit (DFT), more specifically for carrying out the method of the invention.

It is the object of the invention to indicate a transmission system of the type mentioned above by means of which the number of subchannels available for modulation may be increased and the technical expenditure may be kept as low as possible.

According to the invention this object is achieved in that for each subcarrier contained in the fade-out range or adjacent thereto a processing unit is connected in front of the IDFT unit, said processing unit serving to compute side lobes occasioned by subchannels that are located outside the fade-out range, wherein the data to be transmitted may be entered at the input of the processing unit and the subcarriers contained in the fade-out range and the subcarriers adjacent thereto which have a charge compensating for the side lobes may be sampled at the output of the processing unit (4'), wherein said subcarriers may be stored by the IDFT-unit together with the unaltered charges of the other subcarriers located outside the fade-out range.

Superimposition of the compensation pulses on the transmitter signal is no longer necessary and the subcarriers in the fade-out range are already charged in such a manner that sufficient compensation of the side lobes may be achieved.

The invention also relates to a method of suppressing narrow frequency bands in fade-out ranges during transmission of data by means of a multiple carrier method, e.g. DMT (Discrete Multitone) in which a predetermined broad frequency band is divided into a plurality of subchannels having subcarriers assigned thereto and in which the data to be transmitted is modulated in the transmitter with Inverse Discrete Fourier Transform (IDFT) and is demodulated in the receiver with Discrete Fourier Transform (DFT), each subchannel being thus provided in the spectrum with a major lobe and several side lobes occurring in the region of nearby subcarriers.

It is the object of the present invention to indicate a method as mentioned herein above by means of which it is possible to perform an efficient suppression of narrow frequency bands in fade-out

ranges and with which only a relatively small number of subcarriers for the transmission of information needs to be kept free for fading out the narrow frequency ranges.

According to the invention this is achieved in that at least part of the subcarriers contained in at least one fade-out range and of the subcarriers adjacent thereto respectively are utilized as compensation sounds, the charge of which being calculated in such a way that the integral of the weighted and sent power density spectrum is minimized over the entire frequency range.

Thanks to the statistical method of calculation employed, the thus transmitted compensation sounds may be calculated very accurately and with relatively little mathematical expenditure.

According to the invention this object is also achieved in that at least part of the subcarriers contained in at least one fade-out range and of the subcarriers adjacent thereto respectively are utilized as compensation sounds, the charge of which being calculated in such a way that the integral is minimized over the entire frequency range of the weighted, squared amplitude of the Fourier transformed of the sent data signal by way of a number of data blocks that may be predetermined.

The accuracy of the deterministic method of calculation utilized for this purpose increases with the number of data blocks that are available for the calculation. Since storage capacity cannot be increased ad lib, the result depends on the capacity of the processing unit.

According to another development of the present invention, data that have already been sent may be considered in the calculation. The accuracy of the calculation can be improved by including the data already sent.

According to another feature of the invention, either a Guard Interval or a cyclical prefix may be transmitted between the data combined to blocks. The method according to the invention may be utilized for either of the two ways of forming intervals.

The invention will be explained more fully hereinafter with reference to the exemplary